भारतीय मानक

IS 344 : 2023

Indian Standard

वार्निश, स्टोविंग — विशिष्टि

(दूसरा पुनरीक्षण)

Varnish, Stoving — Specification

(Second Revision)

ICS 87.040

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June 2023 **Price Group 5**

Paints, Varnishes and Related Products Sectional Committee, CHD 20

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Paints, Varnishes, and Related Products Sectional Committee had been approved by the Chemical Division Council.

This standard was originally published in 1952 and the first revision was done in 1976. In that revision, requirement for acid value was reduced; requirement for flash point was reduced to allow use of stronger solvents; drying schedule (stoving temperature and period) was modified in accordance with the latest practice in the field; and requirement for colour of the material was suitably modified.

This revision has taken up in order to bring out the standard in the latest style and format of the Indian Standards. In addition, the following changes have been made:

a) The maximum limit for lead has been specified considering its adverse impact on human health;
b) The corresponding parts of IS 101 has been referred for the test methods procedure as earlier referred test method IS 197 has been withdrawn;
c) A suitable precautionary note has been added in the marking clause in order to prevent unforeseen events; and
d) References of Indian Standards have been updated wherever required.

The composition of the committee responsible for the formulation of this standard is listed in Annex G.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded-off value should be the same as that of the specified value in this standard.

Indian Standard

VARNISH, STOVING — SPCIFICATION

(Second Revision)

1 SCOPE

This standard prescribes requirements and methods of sampling and test for the material commercially known as varnish, stoving, used for the protection and decoration of metal surfaces.

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 1303 shall apply.

4 TYPES

The material shall be of the following two types:

a) Clear; and

b) Tinted.

5 REQUIREMENTS

5.1 Description

The material shall be clear and transparent, or tinted, as required, and shall be free from foreign matter, sediment and undissolved water.

5.2 Composition

The material shall be based on resins, drying oils, driers and thinners, together with soluble colouring matter, when required, in suitable proportions to satisfy the requirements of this standard.

5.3 Resistance to Petroleum Hydrocarbon Solvent

The film of the material shall show no sign of permanent injury or removal, when tested as prescribed in Annex B.

5.4 Resistance to Lubricating Oil

The film of the material shall show no sign of permanent injury or removal, when tested as prescribed in Annex C.

5.5 Resistance to Water

The film of the material shall show no sign of softening, blistering, cracking, more than slight dulling or change of colour, or any other sign of failure, when tested as prescribed in Annex D.

5.6 Lead Restriction

The material shall not contain lead or compounds of lead or mixtures of both, as metallic lead more than 90 ppm, when tested for restriction from lead in accordance with IS 101(Part 8/Sec 5).

5.7 The material shall also comply with the requirements given in Table 1.

6 PACKING AND MARKING

6.1 Packing

The material shall be packed in tin or galvanized containers, or as agreed to between the purchaser and the supplier.

NOTE — The material, when intended for defence purposes, shall be packed and marked in accordance with IS 5661.

6.2 Marking

Each container shall be marked with the following particulars:

a) Name and type of the material;
b) Name of the manufacturer or his recognized trade-mark, if any;
c) Volume of the material;
d) Batch No. or lot No. in code or otherwise;
e) Month and year of manufacture;
f) Lead content, Max, as declared; and
g) A cautionary note as below:
    1) Keep out of reach of children;
    2) Dried film of this paint may be harmful if eaten or chewed; and
    3) This product may be harmful if swallowed or inhaled.

6.2.1 The containers may also be marked with the BIS Certification Mark.

The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6.3 Other details of packing and marking shall be in accordance with the instructions given by the purchaser.

7 SAMPLING

Representative samples of the material shall be prepared as prescribed under IS 101 (Part 1/Sec 1).

8 TEST METHODS

8.1 Tests shall be conducted as prescribed in **5.1** to **5.7**. The test methods referred to are given in co1 (4) of Table 1 and Annex A to E.

8.1.1 Tests marked with obelisk (†) in Table 1 shall be carried out on stoved film. Stoving shall be carried out for 45 minutes at 120 °C or as agreed to between the purchaser and the supplier.

8.2 Quality of Reagents

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which, affect the results of analysis.

9 CRITERIA FOR CONFORMITY

A lot shall be declared as conforming to the requirements of this standard if the test results on the composite sample satisfy the requirements prescribed under **5.**

Table 1 Requirements for Varnish, Stoving
(*Clause* 5.7)

Sl No. (1)	Characteristic (2)	Requirement (3)	Method of Test, Ref to (4)
i)	Drying time†, hard dry	Not more than 45 minutes at 120 °C or as agreed to between the purchaser and the supplier	IS 101 (Part 3/Sec 1)
ii)	Finish†	Smooth and glossy	IS 101 (Part 3/Sec 4)
iii)	Colour†	Close match to the approved sample or as agreed to between the purchaser and the supplier	IS 101 (Part 4/Sec 2)
iv)	Scratch hardness†	No such scratch as to show the bare metal	IS 101 (Part 5/Sec 1)
v)	Flexibility and adhesion†	No visible damage or detachment of film	IS 101(Part 5/Sec 2)
vi)	Stripping test†	Scratches free from jagged Edges	Annex E
vii)	Flash point, °C, *Min*	21	IS 101(Part l/Sec 6)
viii)	Volatile matter content, percent by mass, *Max*	60.0	IS 101(Part 2/Sec 2)
ix)	Viscosity at 30 °C	As agreed to between the purchaser and the supplier	IS 101 (Part 1/ Sec 5)
x)	Acid value, *Max*	15.0	IS 101 (Part 9/Sec 1)
xi)	Keeping properties	Not less than one year from the date of manufacture	Annex F

†The test shall be carried out on stoved film (*see* **8.1.1**).

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
IS 101	Methods of sampling and test for paints, varnishes and related products:
(Part 1) : 1986	Tests on liquid paints (general and physical),
(Sec 1) : 1986	Sampling (*third revision*)
(Sec 5) : 1989	Consistency (*third revision*)
(Sec 6) : 1987	Flash point (*third revision*)
(Part 2/Sec 2) : 1986	Test on liquid paints (chemical examination), Section 2 Volatile matter (*third revision*)
(Part 3) : 1986	Tests on paint film formation,
(Sec 1) : 1986	Drying time (*third revision*)
(Sec 4) : 1987	Finish (*third revision*)
(Part 4/Sec 2) : 2021	Optical tests, Section 2 Colour-visual comparison of colour of paints (*fourth revision*)
(Part 5/Sec 1) : 1988	Mechanical test on paint films
(Sec 1) : 1988	Hardness tests (*third revision*)
(Sec 2) : 1988	Flexibility and adhesion (*third revision*)
(Part 8/Sec 5) : 2022	Tests for pigments and other solids, Section 5 Lead restriction test (*first revision*)
(Part 9/Sec 1) : 1993	Tests for lacquers and varnish, Section 1 Acid value (*third revision*)
IS 493 (Part 1) : 2019	Specification for general purpose machinery and spindle oils: Part 1 Machinery oils (*second revision*)
IS 1070 : 1992	Reagent grade water — Specification (*third revision*)
IS 1745 : 2018	Petroleum hydrocarbon solvents — Specification (*third revision*)
IS 5661 : 1970	Code of practice for packing and marking of packages of paints, enamels, varnishes and allied products

ANNEX B

(*Clause* 5.3)

TEST FOR RESISTANCE TO PETROLEUM HYDROCARBON SOLVENT

B-1. Apply a coat of the material by brushing to a 150 mm × 50 mm × 0.32 mm tinned plate panel to give a dry film mass of 17 g/m^2 to 25 g/m^2. Stove the panel under conditions specified in **8.1.1**. Allow to cool to room temperature, immerse in petroleum hydrocarbon solvent (*see* IS 1745) for 1 minute, remove and allow to stand in vertical position for 5 minutes at room temperature. Swab vigorously for 5 seconds with cotton-wool swab soaked in petroleum hydrocarbon solvent.

B-2 The film shall show no sign of permanent injury or removal.

ANNEX C

(*Clause* 5.4)

TEST FOR RESISTANCE TO LUBRICATING OIL

C-1 Prepare a 150 mm × 50 mm × 0.32 mm panel as prescribed in **B-1**. Allow to cool to room temperature and immerse for 2 hours at a temperature of 50 °C in mineral lubricating oil (*see* IS 493 Part 1) having a time of flow, for 50 ml, of approximately 80 seconds at 60 °C in a No. 1 Redwood viscometer. Wipe the film free from the lubricating oil.

C-2 The film shall show no sign of permanent injury or removal.

ANNEX D

(*Clause* 5.5)

TEST FOR RESISTANCE TO WATER

D-1 Prepare a glass panel as prescribed under **B-1**. Allow to cool to room temperature and immerse in distilled water for 24 hours. Examine the panel 4 hours after removal from the water.

D-2 The film shall show no sign of softening, blistering, cracking, more than slight dulling or change of colour, or any other sign of failure.

ANNEX E

STRIPPING TEST

[*Table* 1 (vi)]

E-0 OUTLINE OF THE METHOD

The Minimum load required to produce a scratch showing the bare metal surface of the panel coated with the material is determined.

E-1 APPARATUS

The apparatus used for determining the scratch hardness as prescribed in IS 101 (Part 5/Sec 2) shall be used.

E-2 PROCEDURE

Apply a coat of the material by either brushing or spraying, whichever is specified in the material specification, to a 150 mm× 50 mm× 0.315 mm tinned mild steel panel prepared as described in IS 101 (Part 1/Sec 3). Allow the panel to air-dry in a horizontal position for 48 hours under specified drying conditions or stove as specified in the material specification. Condition the test panels at standard atmospheric conditions for at least 26 hours before testing. Test the dried film in the apparatus under such a load that a scratch is produced showing the bare metal surface.

E-3 The scratch so produced shall be free from jagged edges.

ANNEX F

KEEPING PROPERTIES

[*Table* 1 (xi)]

When stored under cover in a dry place in the original sealed containers under normal temperature conditions, the material shall meet the requirement as specified in 5 for the specified period after the date of manufacture. Slight changes in viscosity may be allowed provided the material satisfies the other requirements prescribed in the material specification.

ANNEX G

(*Foreword*)

COMMITTEE COMPOSITION

Paints, Varnishes and Related Products Sectional Committee, CHD 20

Organization	*Representative(s)*
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Amendments Issued Since Publication

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